FIG. 1

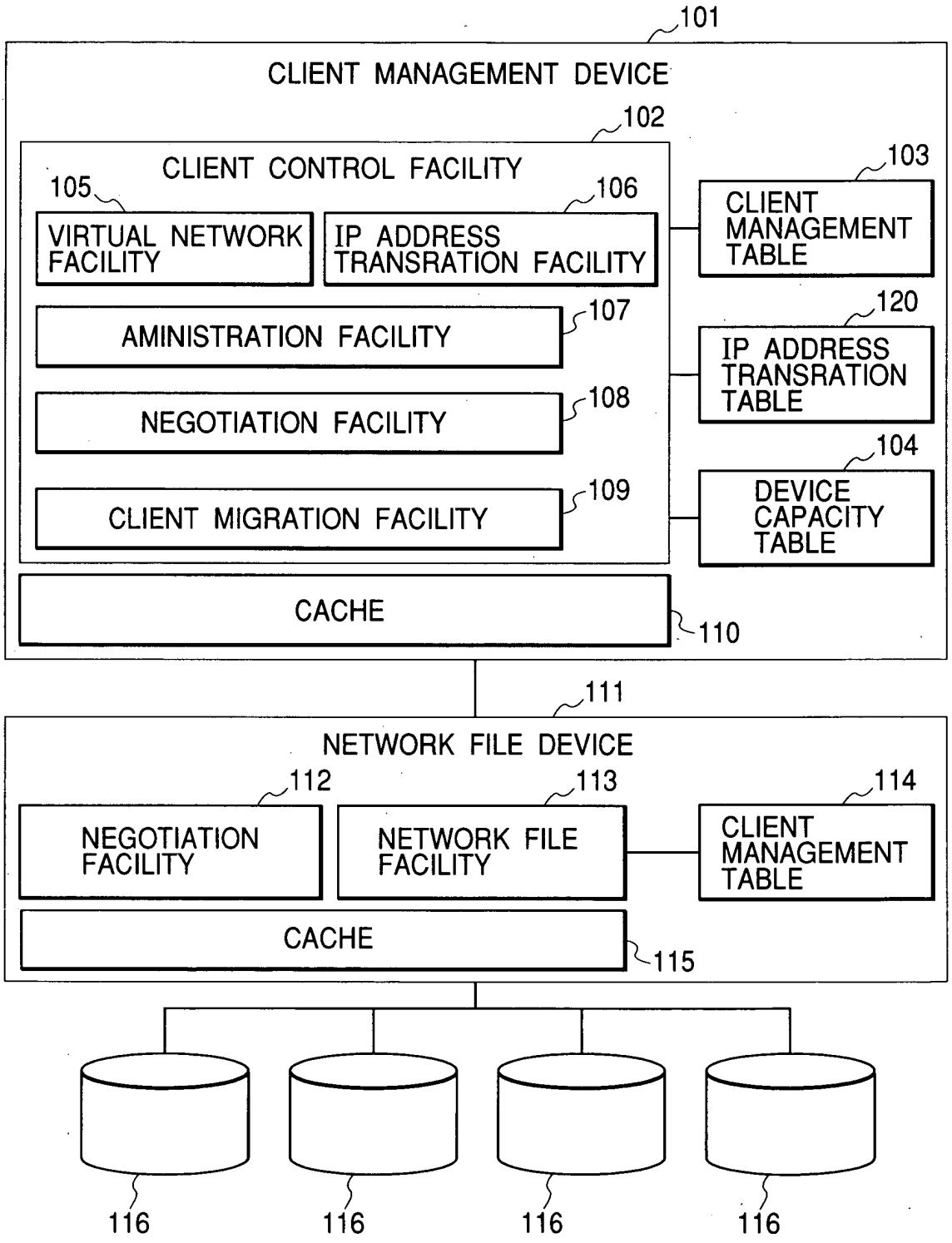

101
CLIENT MANAGEMENT DEVICE
102
CLIENT CONTROL FACILITY
105
VIRTUAL NETWORK FACILITY
106
IP ADDRESS TRANSRATION FACILITY
107
AMINISTRATION FACILITY
108
NEGOTIATION FACILITY
109
CLIENT MIGRATION FACILITY
103
CLIENT MANAGEMENT TABLE
120
IP ADDRESS TRANSRATION TABLE
104
DEVICE CAPACITY TABLE
CACHE
110
111
NETWORK FILE DEVICE
112
NEGOTIATION FACILITY
113
NETWORK FILE FACILITY
114
CLIENT MANAGEMENT TABLE
CACHE
115
116
116
116
116

FIG. 2

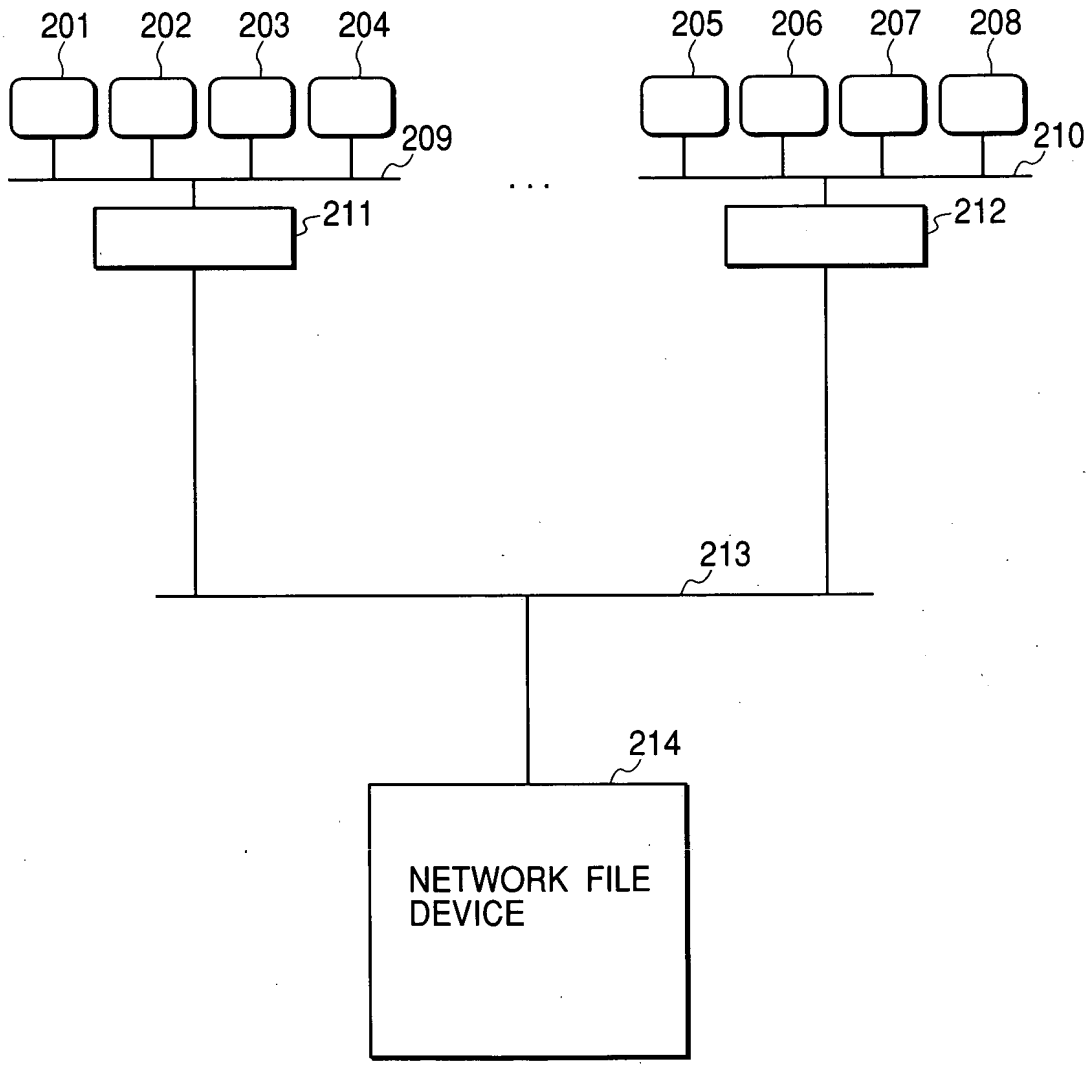

201
202
203
204
209
205
206
207
208
210
211
212
213
214
NETWORK FILE DEVICE

FIG. 3

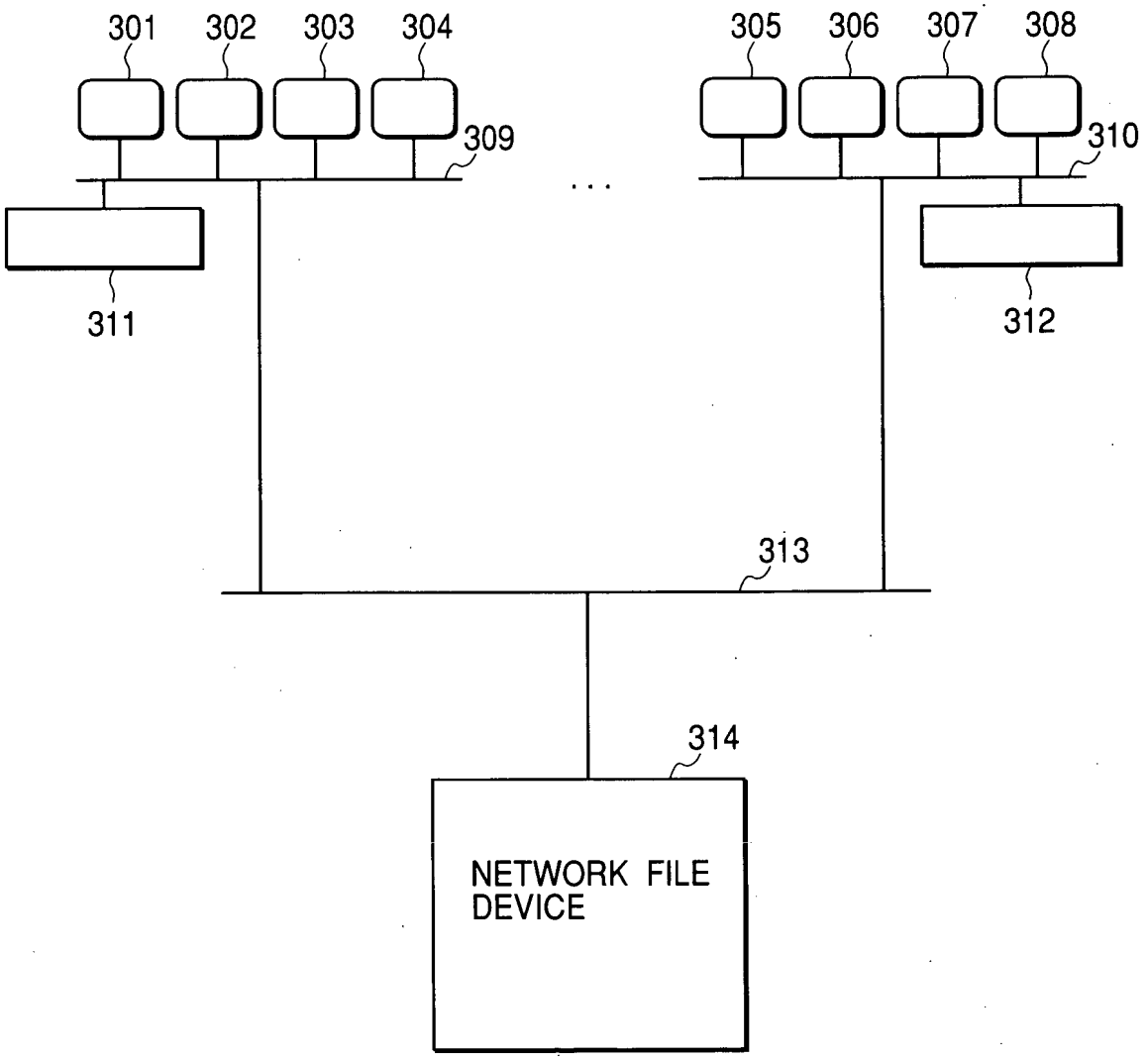

301
302
303
304
309
305
306
307
308
310
311
312
313
314
NETWORK FILE DEVICE

FIG. 4

401 DIRECTORY NAME	402 IP ADDRESS	403 ATTRIBUTE
/USER/A	192.168.100.10	READ/WRITE
/USER/B	192.168.100.11	READ
/USER/C	192.168.100.12	READ/WRITE
...	...	...

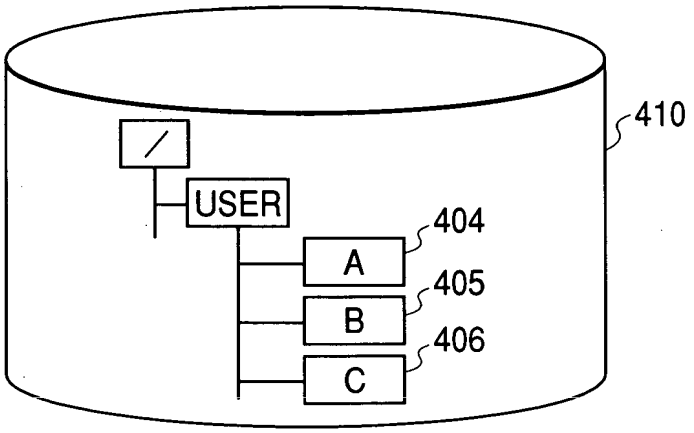


FIG. 5

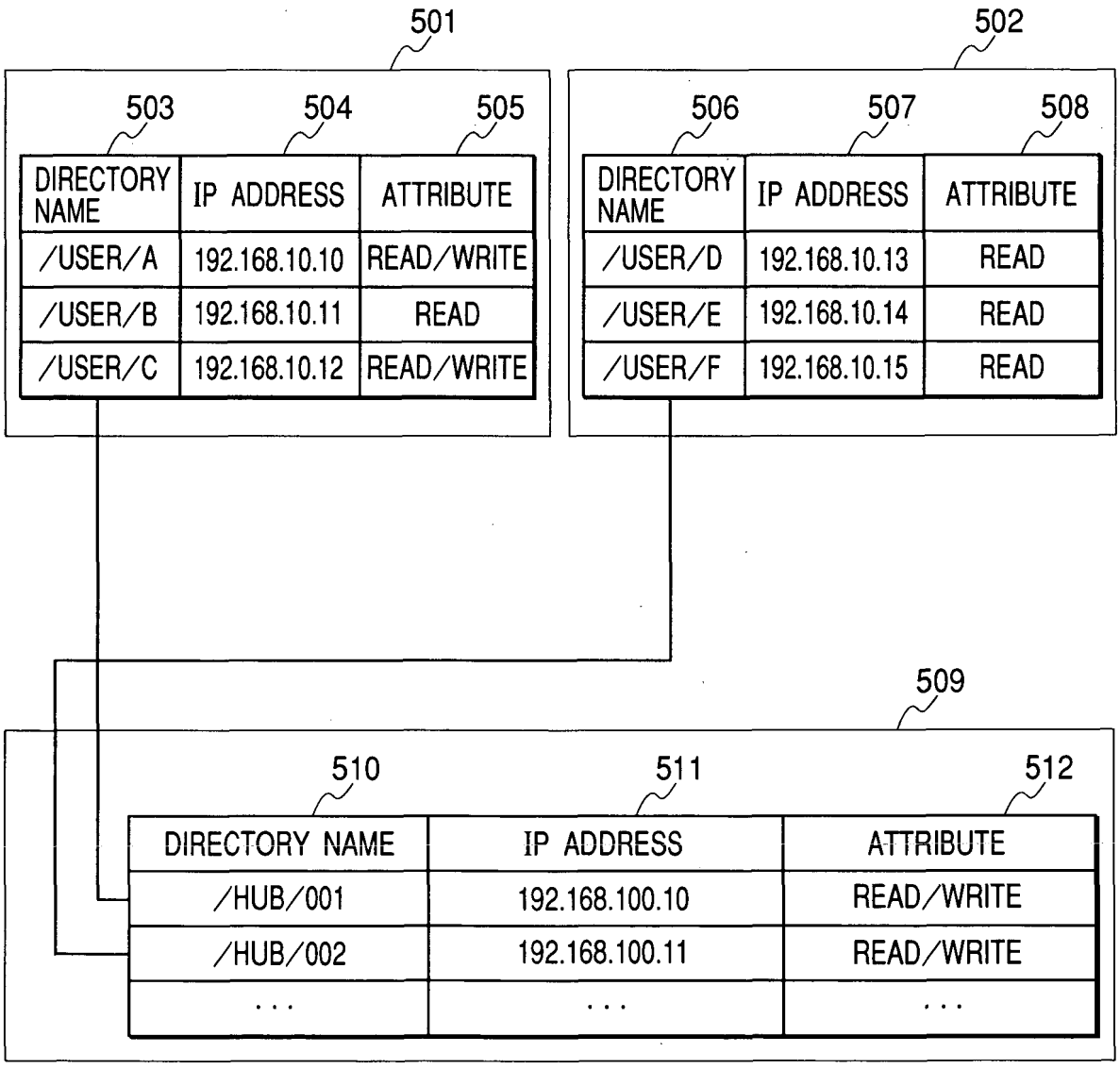

501
502
503
504
505
506
507
508
DIRECTORY NAME
IP ADDRESS
ATTRIBUTE
/USER/A
192.168.10.10
READ/WRITE
/USER/B
192.168.10.11
READ
/USER/C
192.168.10.12
READ/WRITE
DIRECTORY NAME
IP ADDRESS
ATTRIBUTE
/USER/D
192.168.10.13
READ
/USER/E
192.168.10.14
READ
/USER/F
192.168.10.15
READ
509
510
511
512
DIRECTORY NAME
IP ADDRESS
ATTRIBUTE
/HUB/001
192.168.100.10
READ/WRITE
/HUB/002
192.168.100.11
READ/WRITE
. . .
. . .
. . .

FIG. 6

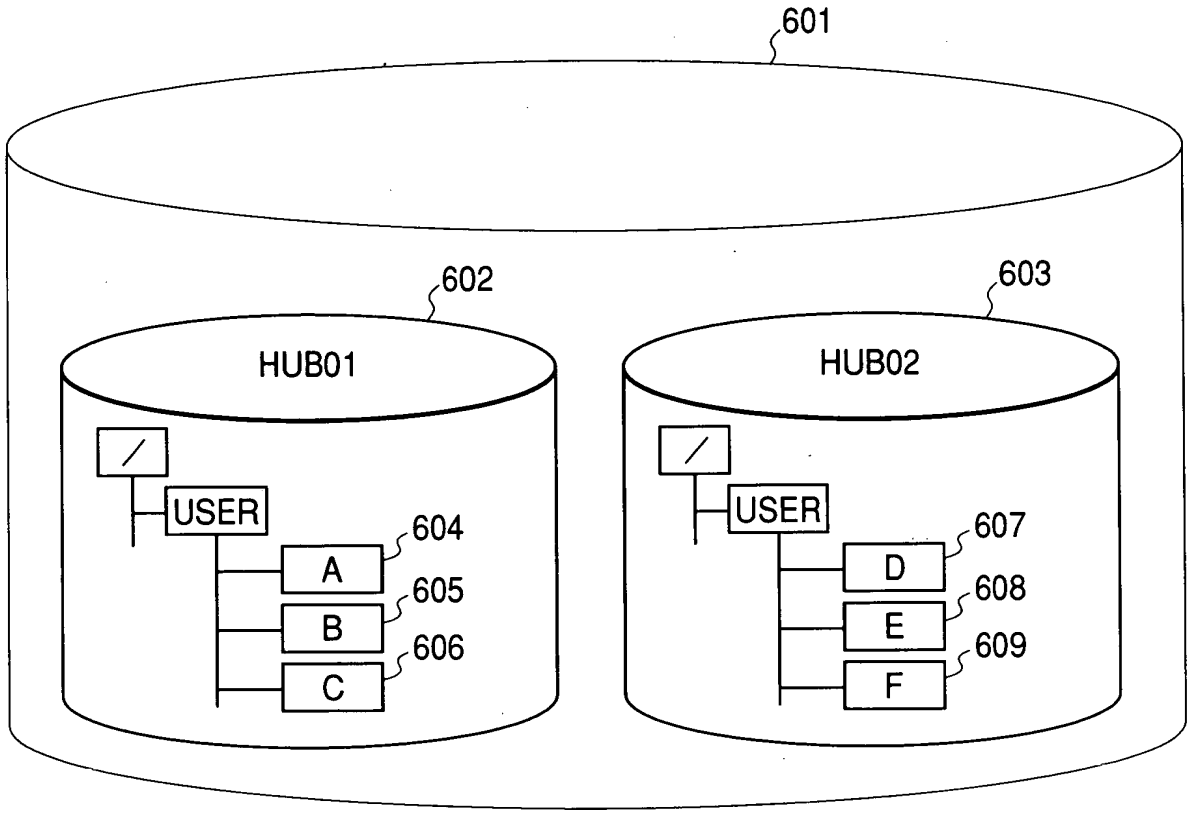

601
602
HUB01
/
USER
604
A
605
B
606
C
603
HUB02
/
USER
607
D
608
E
609
F

FIG. 7

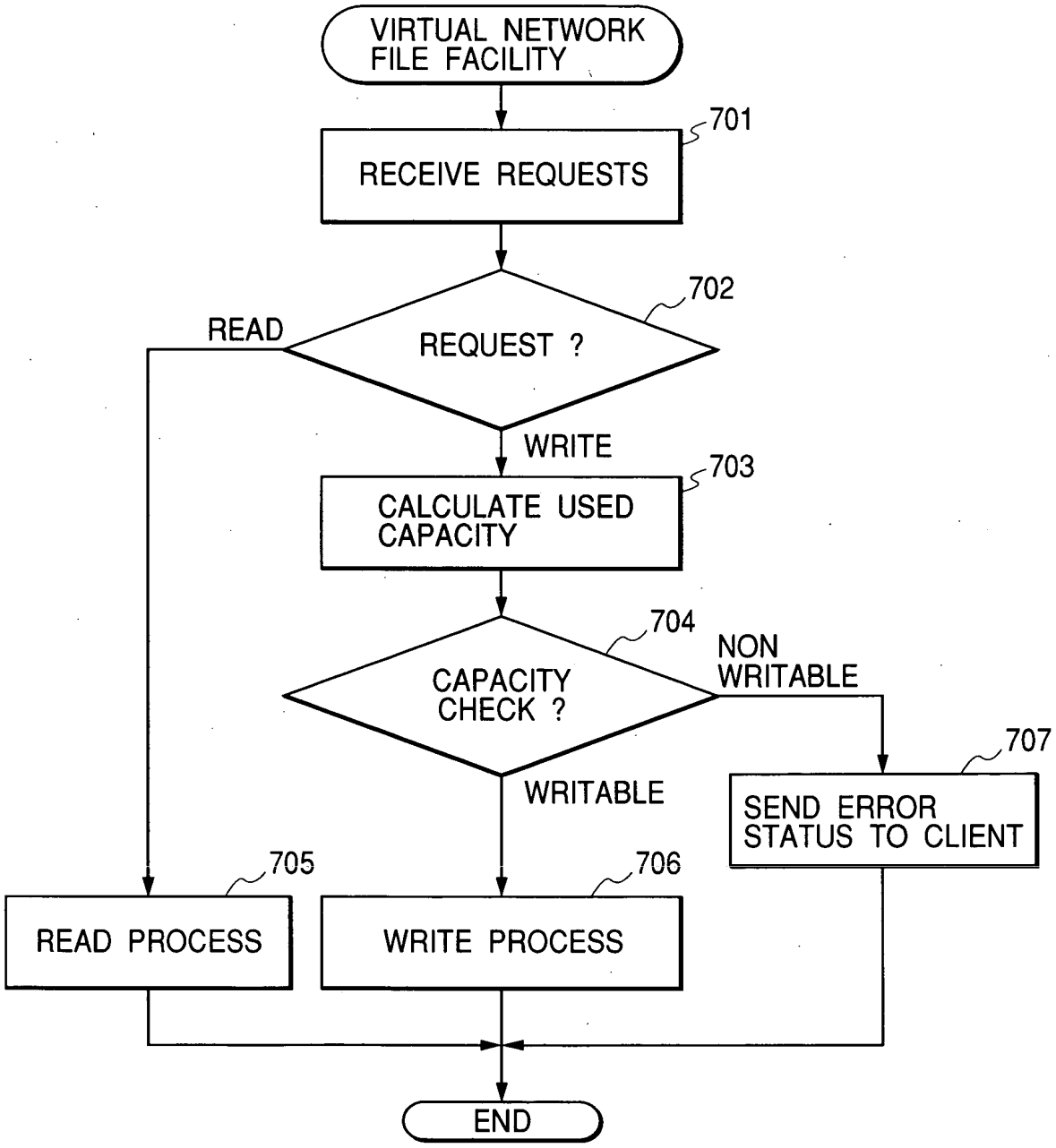

VIRTUAL NETWORK FILE FACILITY
701
RECEIVE REQUESTS
702
READ
REQUEST ?
WRITE
703
CALCULATE USED CAPACITY
704
CAPACITY CHECK ?
NON WRITABLE
707
SEND ERROR STATUS TO CLIENT
WRITABLE
705
706
READ PROCESS
WRITE PROCESS
END

FIG. 8

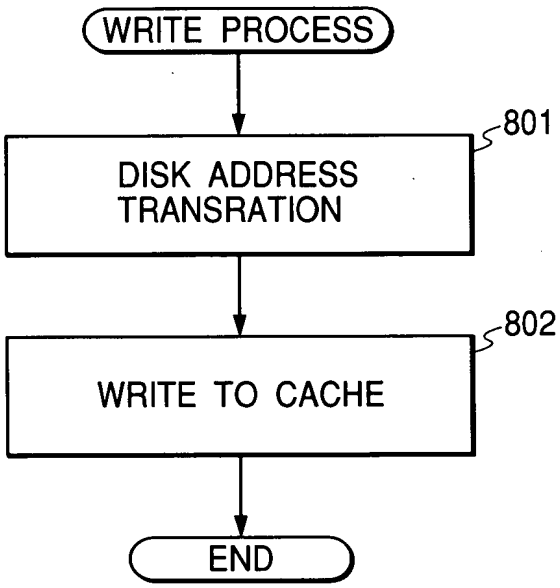

WRITE PROCESS
801
DISK ADDRESS TRANSRATION
802
WRITE TO CACHE
END

FIG. 9

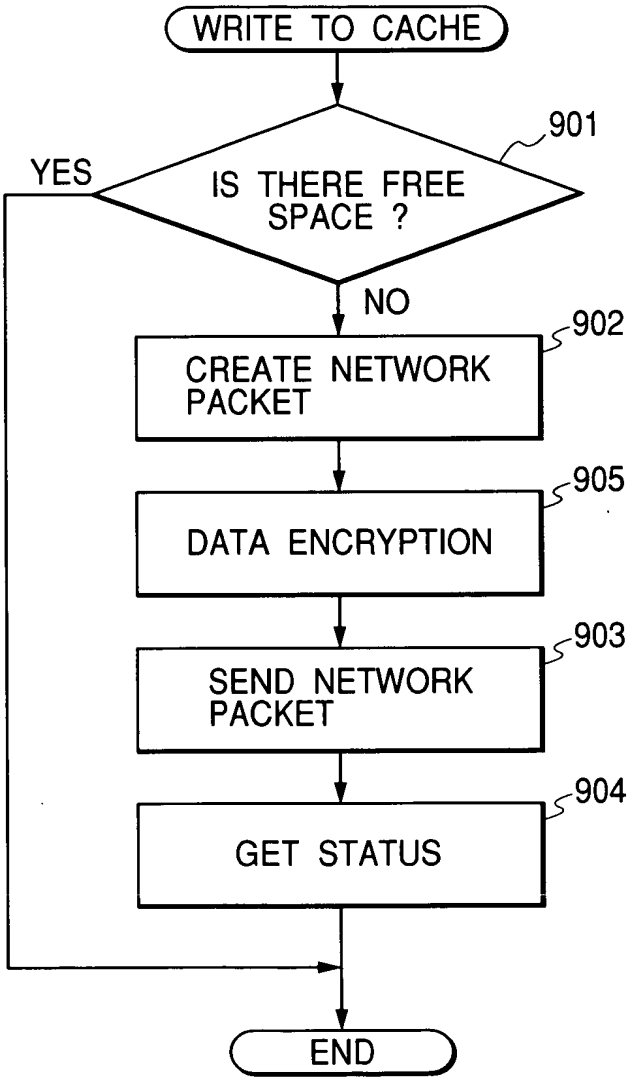

WRITE TO CACHE
901
YES
IS THERE FREE SPACE ?
NO
902
CREATE NETWORK PACKET
905
DATA ENCRYPTION
903
SEND NETWORK PACKET
904
GET STATUS
END

FIG. 10

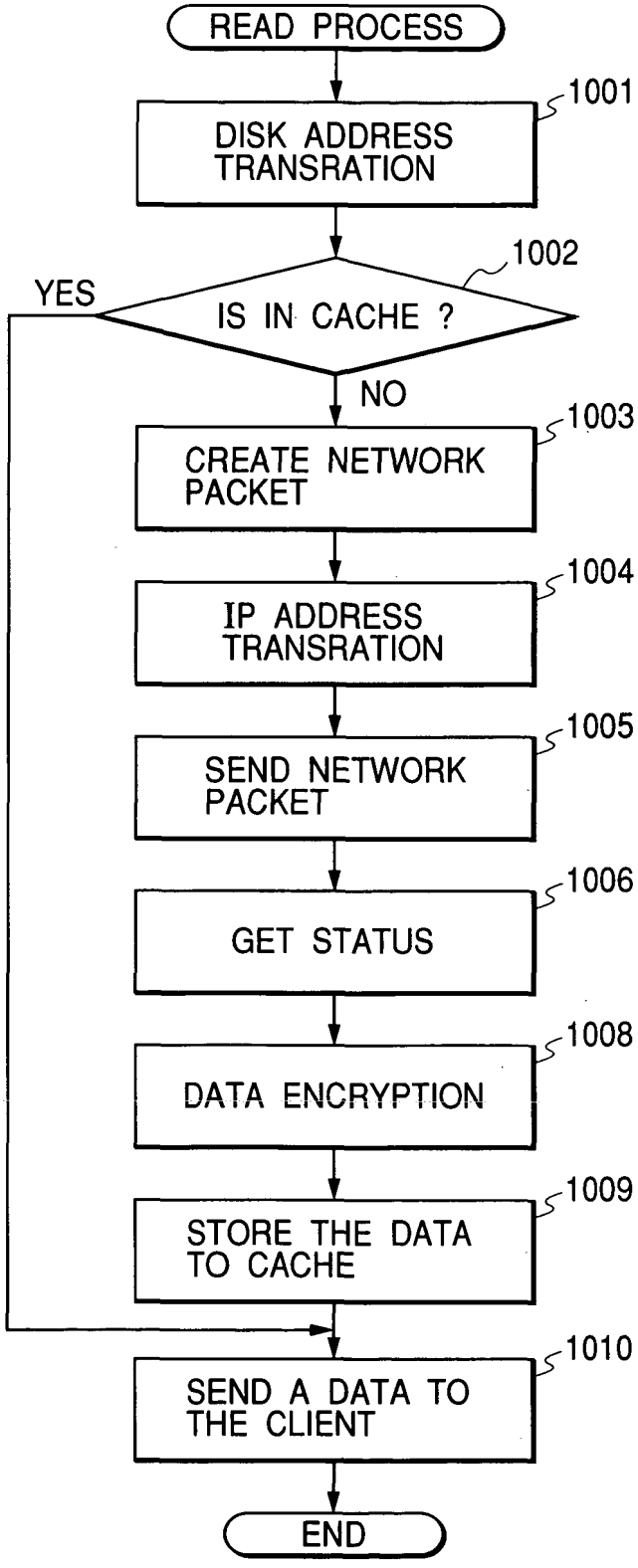

READ PROCESS
DISK ADDRESS TRANSRATION
1001
IS IN CACHE ?
1002
YES
NO
CREATE NETWORK PACKET
1003
IP ADDRESS TRANSRATION
1004
SEND NETWORK PACKET
1005
GET STATUS
1006
DATA ENCRYPTION
1008
STORE THE DATA TO CACHE
1009
SEND A DATA TO THE CLIENT
1010
END

FIG. 11

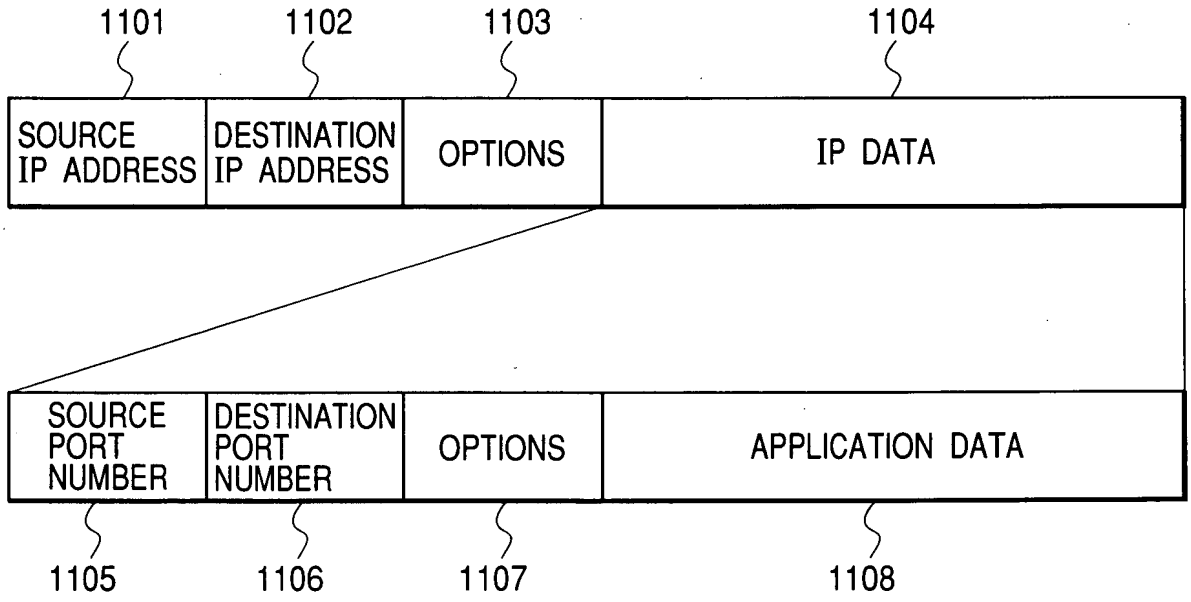

1101
1102
1103
1104
SOURCE IP ADDRESS
DESTINATION IP ADDRESS
OPTIONS
IP DATA
SOURCE PORT NUMBER
DESTINATION PORT NUMBER
OPTIONS
APPLICATION DATA
1105
1106
1107
1108

FIG. 12

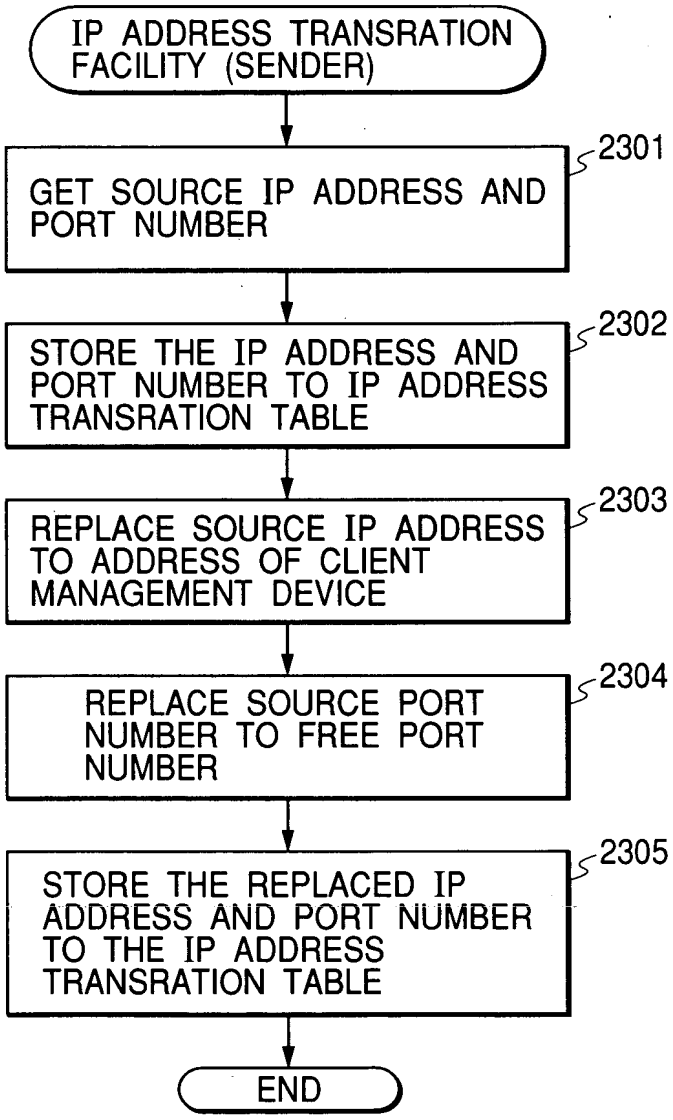

IP ADDRESS TRANSRATION FACILITY (SENDER)
GET SOURCE IP ADDRESS AND PORT NUMBER
2301
STORE THE IP ADDRESS AND PORT NUMBER TO IP ADDRESS TRANSRATION TABLE
2302
REPLACE SOURCE IP ADDRESS TO ADDRESS OF CLIENT MANAGEMENT DEVICE
2303
REPLACE SOURCE PORT NUMBER TO FREE PORT NUMBER
2304
STORE THE REPLACED IP ADDRESS AND PORT NUMBER TO THE IP ADDRESS TRANSRATION TABLE
2305
END

FIG. 13

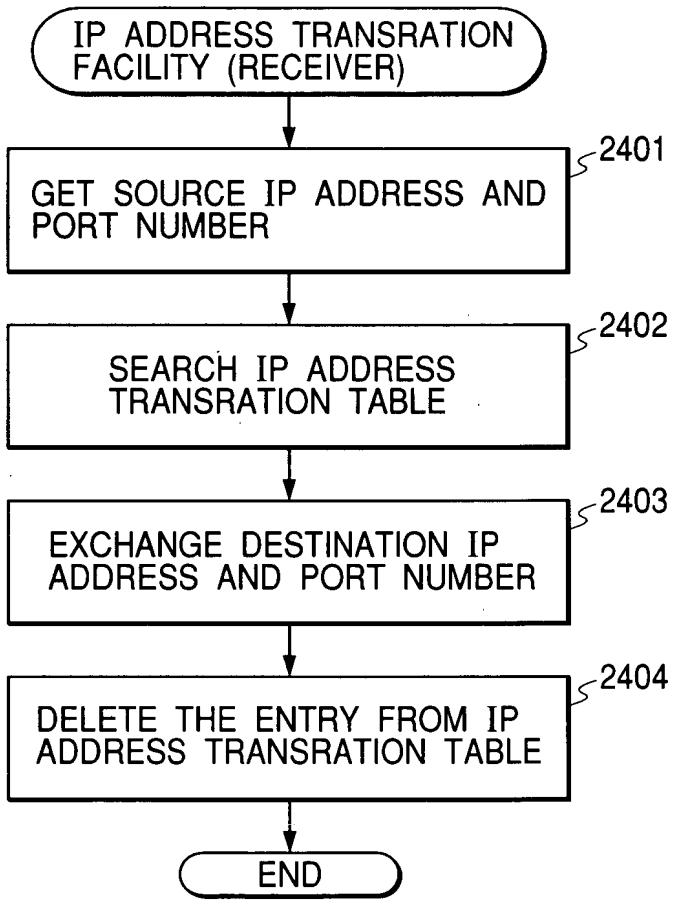

IP ADDRESS TRANSRATION FACILITY (RECEIVER)
GET SOURCE IP ADDRESS AND PORT NUMBER
2401
SEARCH IP ADDRESS TRANSRATION TABLE
2402
EXCHANGE DESTINATION IP ADDRESS AND PORT NUMBER
2403
DELETE THE ENTRY FROM IP ADDRESS TRANSRATION TABLE
2404
END

FIG. 14

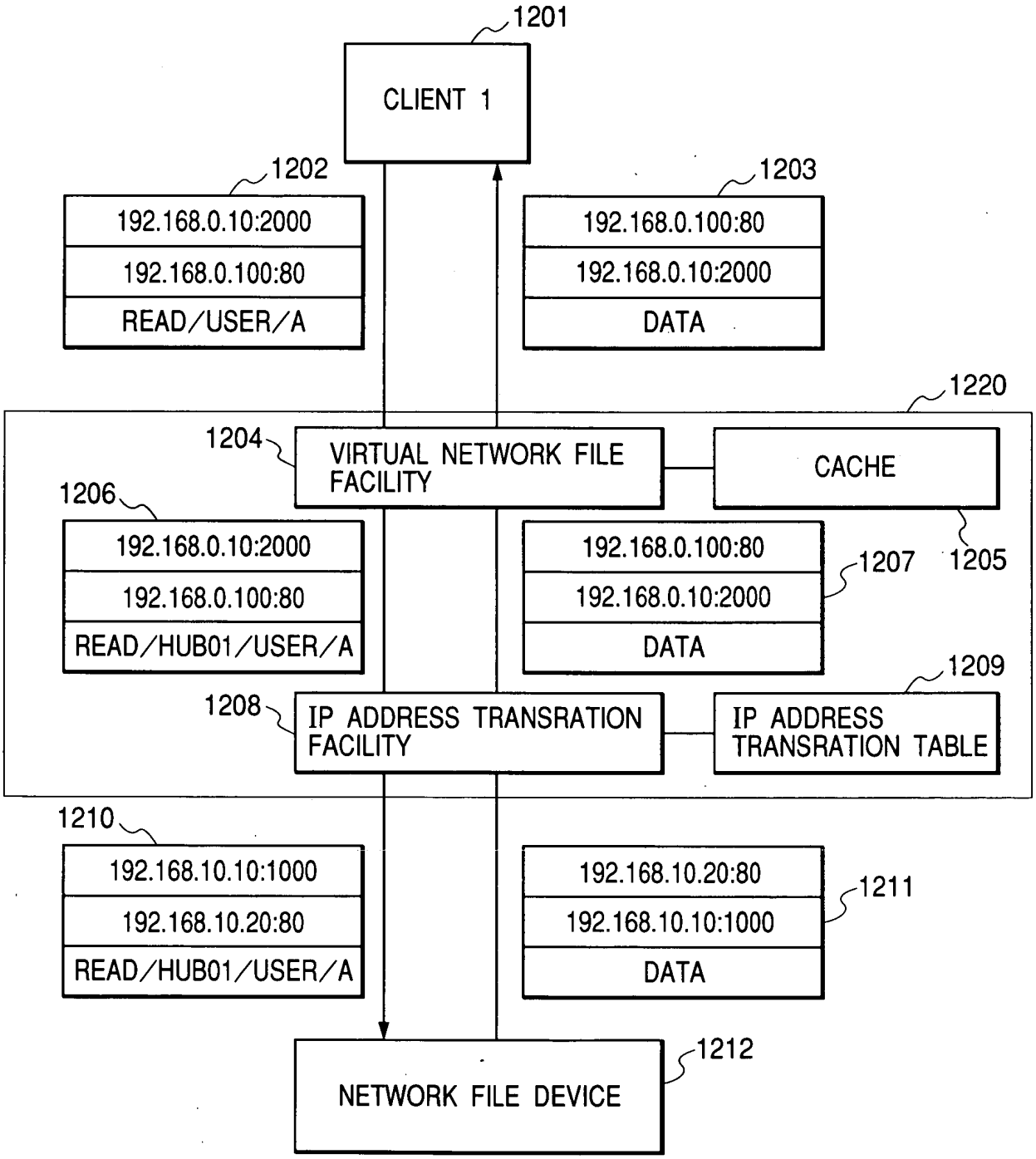

1201
CLIENT 1
1202
192.168.0.10:2000
192.168.0.100:80
READ/USER/A
1203
192.168.0.100:80
192.168.0.10:2000
DATA
1220
1204
VIRTUAL NETWORK FILE FACILITY
CACHE
1205
1206
192.168.0.10:2000
192.168.0.100:80
READ/HUB01/USER/A
192.168.0.100:80
192.168.0.10:2000
DATA
1207
1208
IP ADDRESS TRANSRATION FACILITY
1209
IP ADDRESS TRANSRATION TABLE
1210
192.168.10.10:1000
192.168.10.20:80
READ/HUB01/USER/A
192.168.10.20:80
192.168.10.10:1000
DATA
1211
NETWORK FILE DEVICE
1212

FIG. 15

1301 IP ADDRESS OF CLIENT	1302 PORT NUMBER OF CLIENT	1303 REPLACED IP ADDRESS	1304 REPLACED PORT NUMBER
192.168.0.10	2000	192.168.10.10	10000
192.168.0.20	2001	192.168.10.10	10001
...	...	...	...

FIG. 16

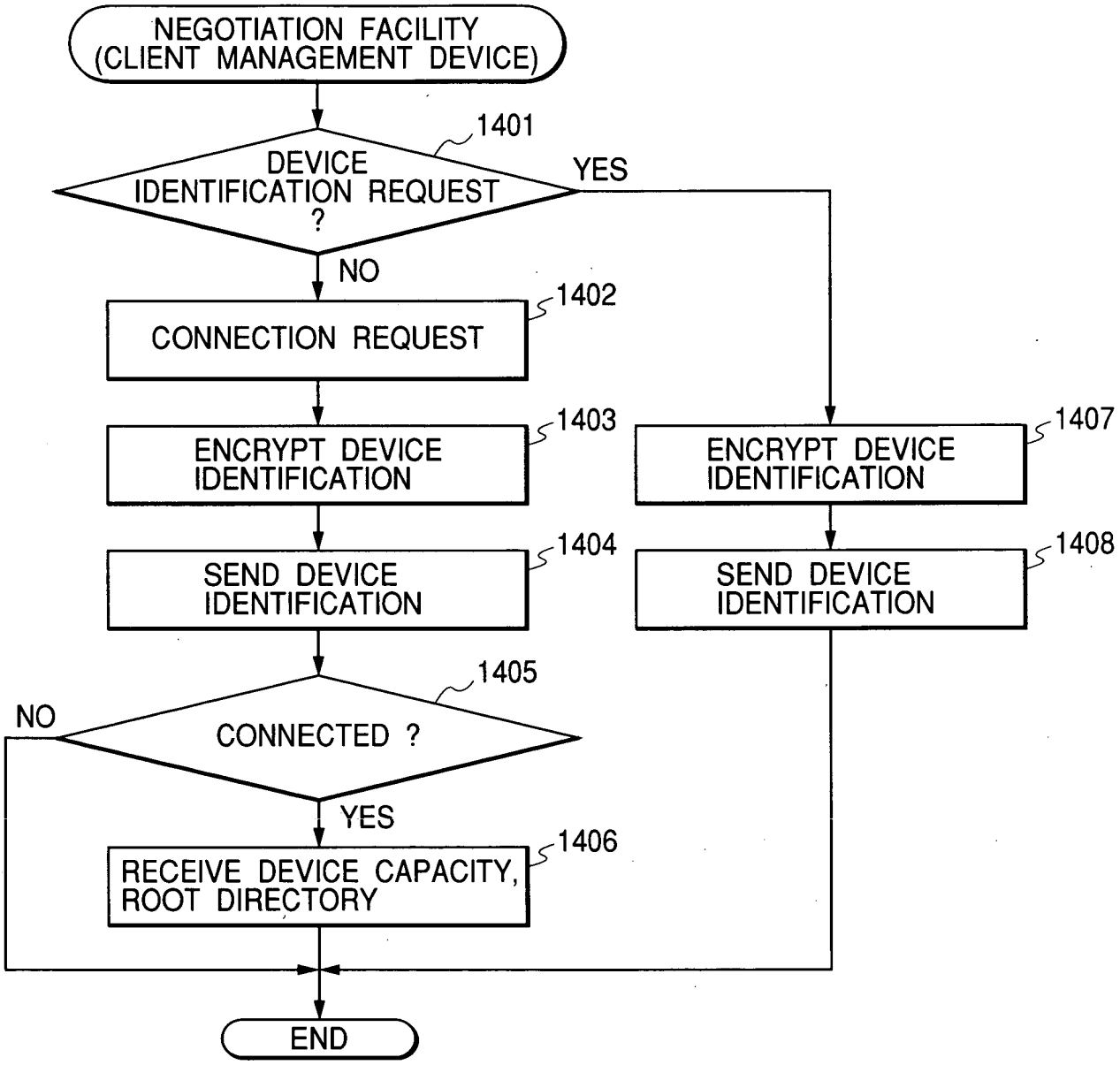

NEGOTIATION FACILITY
(CLIENT MANAGEMENT DEVICE)
1401
DEVICE IDENTIFICATION REQUEST ?
YES
NO
1402
CONNECTION REQUEST
1403
ENCRYPT DEVICE IDENTIFICATION
1404
SEND DEVICE IDENTIFICATION
1405
NO
CONNECTED ?
YES
1406
RECEIVE DEVICE CAPACITY, ROOT DIRECTORY
1407
ENCRYPT DEVICE IDENTIFICATION
1408
SEND DEVICE IDENTIFICATION
END

FIG. 17

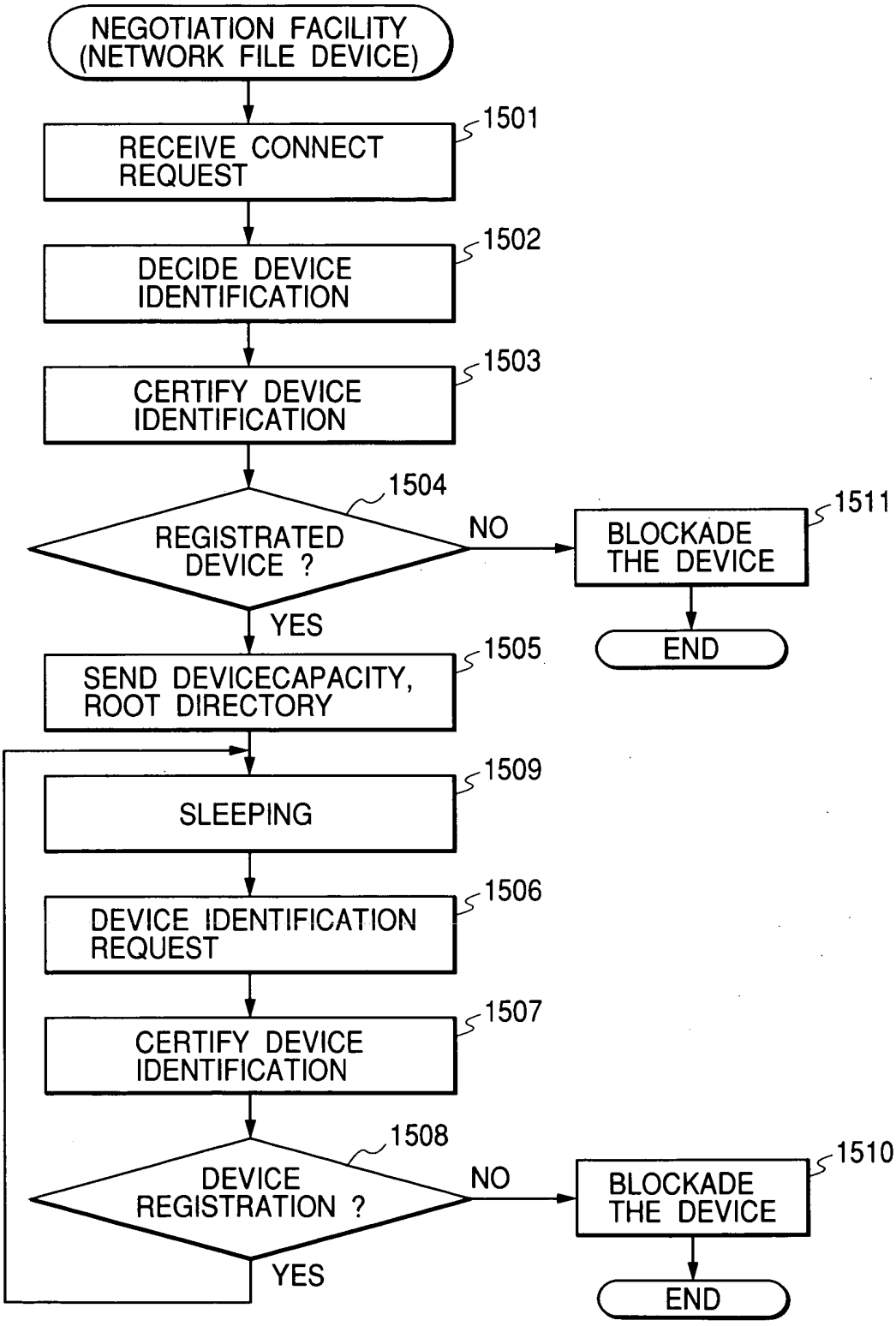

NEGOTIATION FACILITY (NETWORK FILE DEVICE)
RECEIVE CONNECT REQUEST
1501
DECIDE DEVICE IDENTIFICATION
1502
CERTIFY DEVICE IDENTIFICATION
1503
REGISTRATED DEVICE ?
1504
NO
BLOCKADE THE DEVICE
1511
END
YES
SEND DEVICECAPACITY, ROOT DIRECTORY
1505
SLEEPING
1509
DEVICE IDENTIFICATION REQUEST
1506
CERTIFY DEVICE IDENTIFICATION
1507
DEVICE REGISTRATION ?
1508
NO
BLOCKADE THE DEVICE
1510
END
YES

FIG. 18

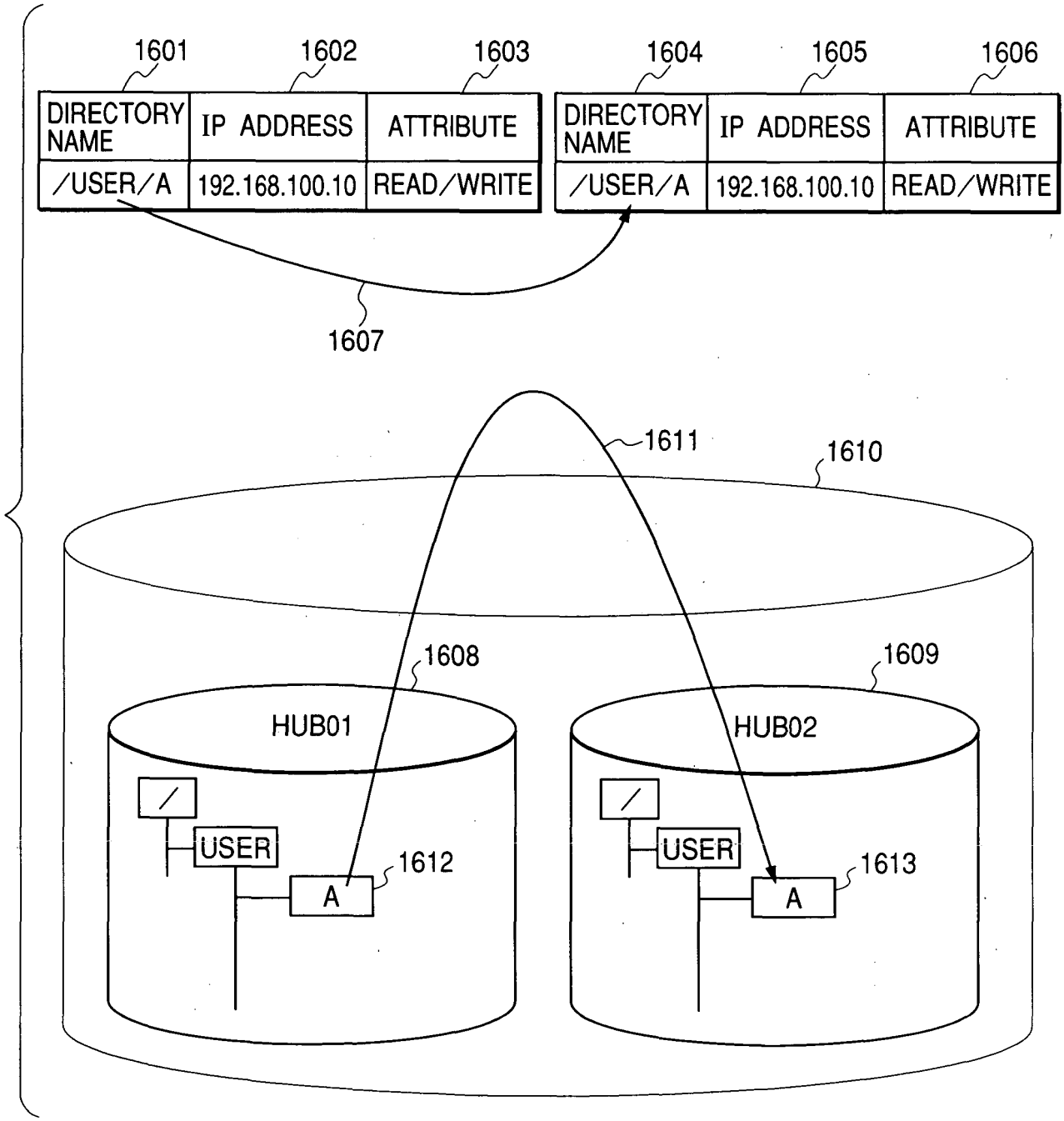

1601
1602
1603
1604
1605
1606
DIRECTORY NAME
IP ADDRESS
ATTRIBUTE
/USER/A
192.168.100.10
READ/WRITE
1607
1611
1610
1608
1609
HUB01
HUB02
/
USER
A
1612
1613

FIG. 19

1701 FILE NAME	1702 USER IP	1703 FILE ATTRIBUTE
/USER/A/FILE 1	501	RW
/USER/A/FILE 2	501	RWX
/USER/B/FILE 3	502	R
/USER/C/FILE 4	503	RW
/USER/C/FILE 5	503	RW

FIG. 20

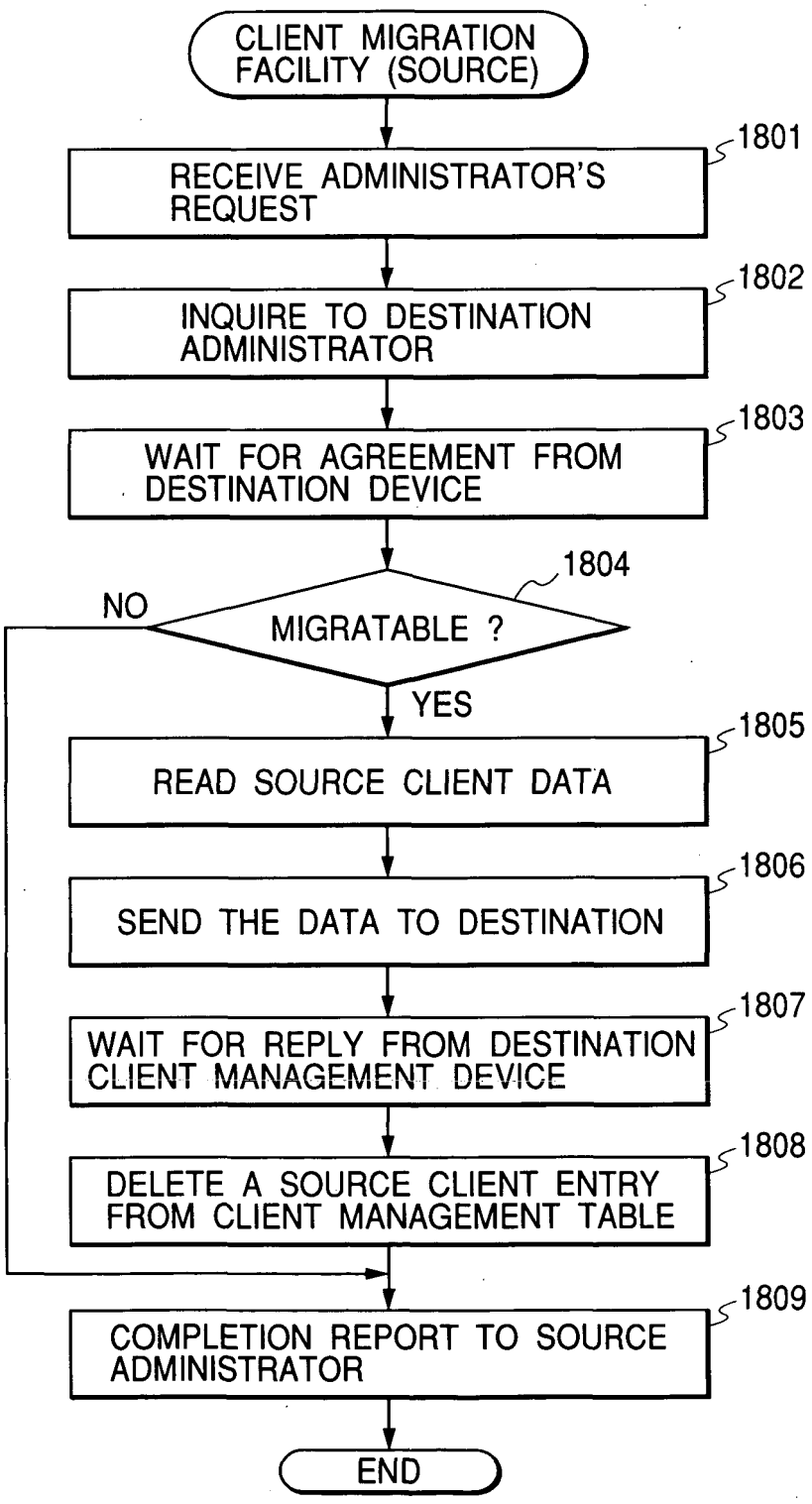

CLIENT MIGRATION FACILITY (SOURCE)
RECEIVE ADMINISTRATOR'S REQUEST
1801
INQUIRE TO DESTINATION ADMINISTRATOR
1802
WAIT FOR AGREEMENT FROM DESTINATION DEVICE
1803
MIGRATABLE ?
1804
NO
YES
READ SOURCE CLIENT DATA
1805
SEND THE DATA TO DESTINATION
1806
WAIT FOR REPLY FROM DESTINATION CLIENT MANAGEMENT DEVICE
1807
DELETE A SOURCE CLIENT ENTRY FROM CLIENT MANAGEMENT TABLE
1808
COMPLETION REPORT TO SOURCE ADMINISTRATOR
1809
END

FIG. 21

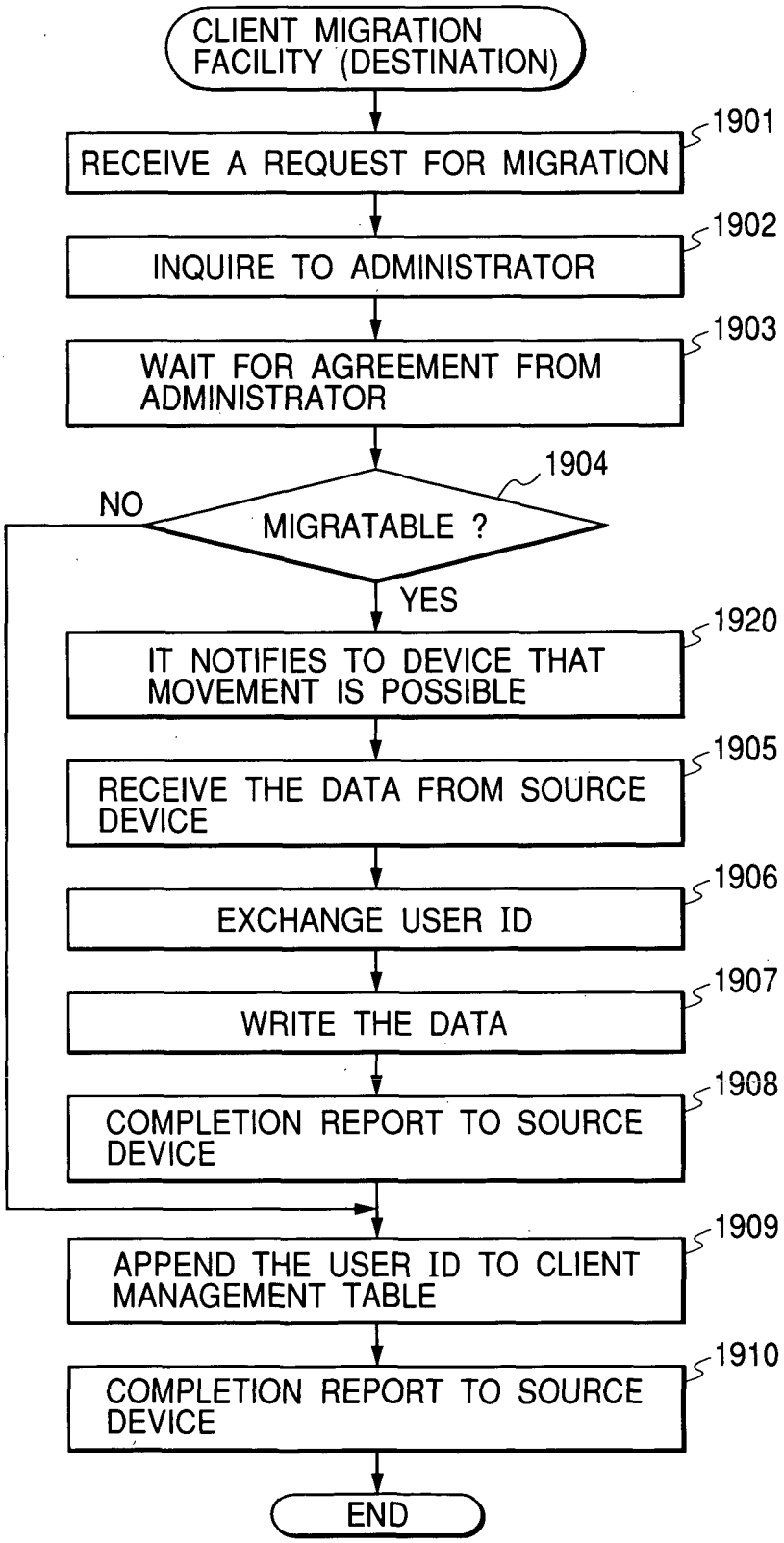

CLIENT MIGRATION FACILITY (DESTINATION)
RECEIVE A REQUEST FOR MIGRATION
1901
INQUIRE TO ADMINISTRATOR
1902
WAIT FOR AGREEMENT FROM ADMINISTRATOR
1903
MIGRATABLE ?
1904
NO
YES
IT NOTIFIES TO DEVICE THAT MOVEMENT IS POSSIBLE
1920
RECEIVE THE DATA FROM SOURCE DEVICE
1905
EXCHANGE USER ID
1906
WRITE THE DATA
1907
COMPLETION REPORT TO SOURCE DEVICE
1908
APPEND THE USER ID TO CLIENT MANAGEMENT TABLE
1909
COMPLETION REPORT TO SOURCE DEVICE
1910
END

FIG. 22

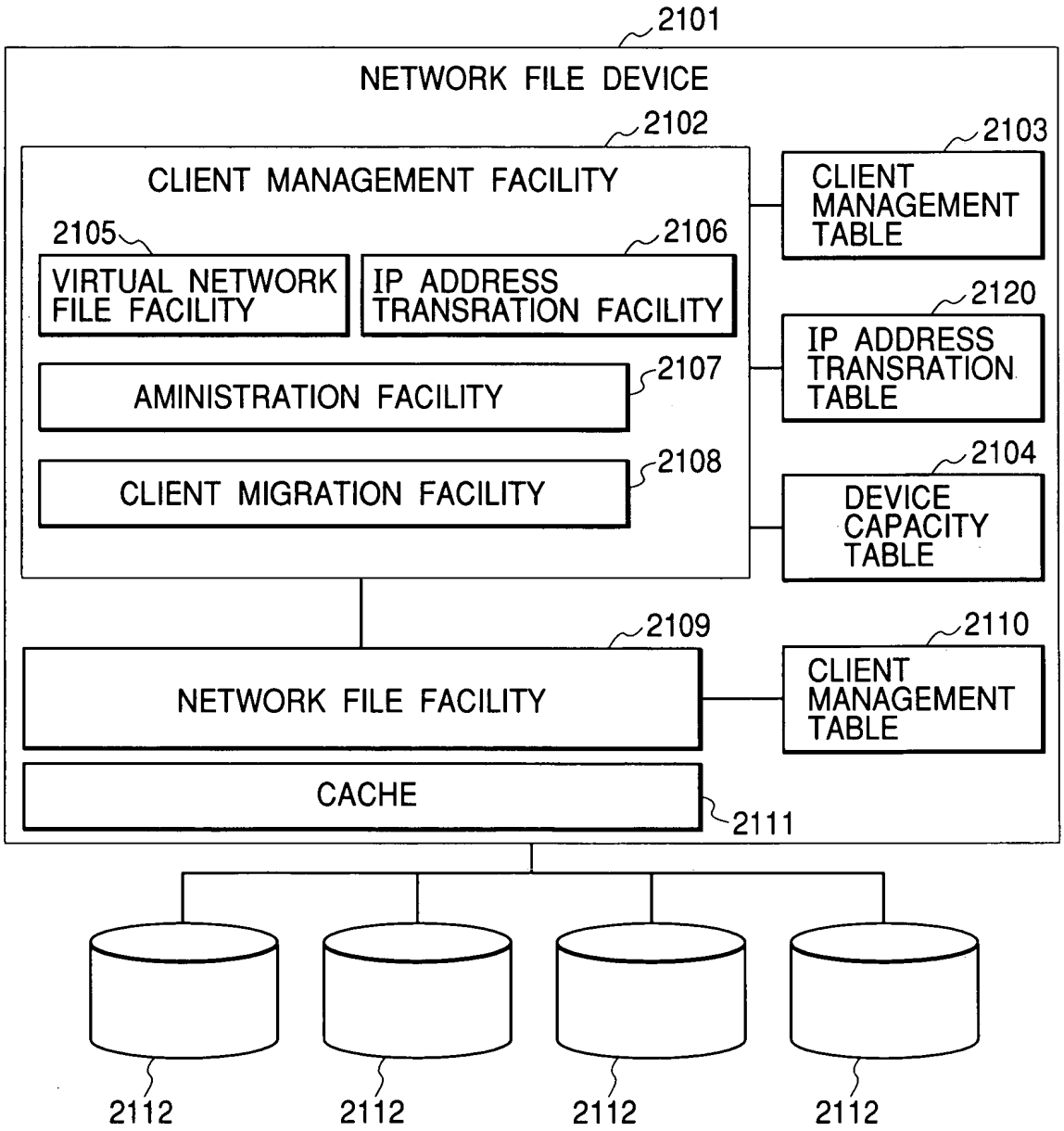
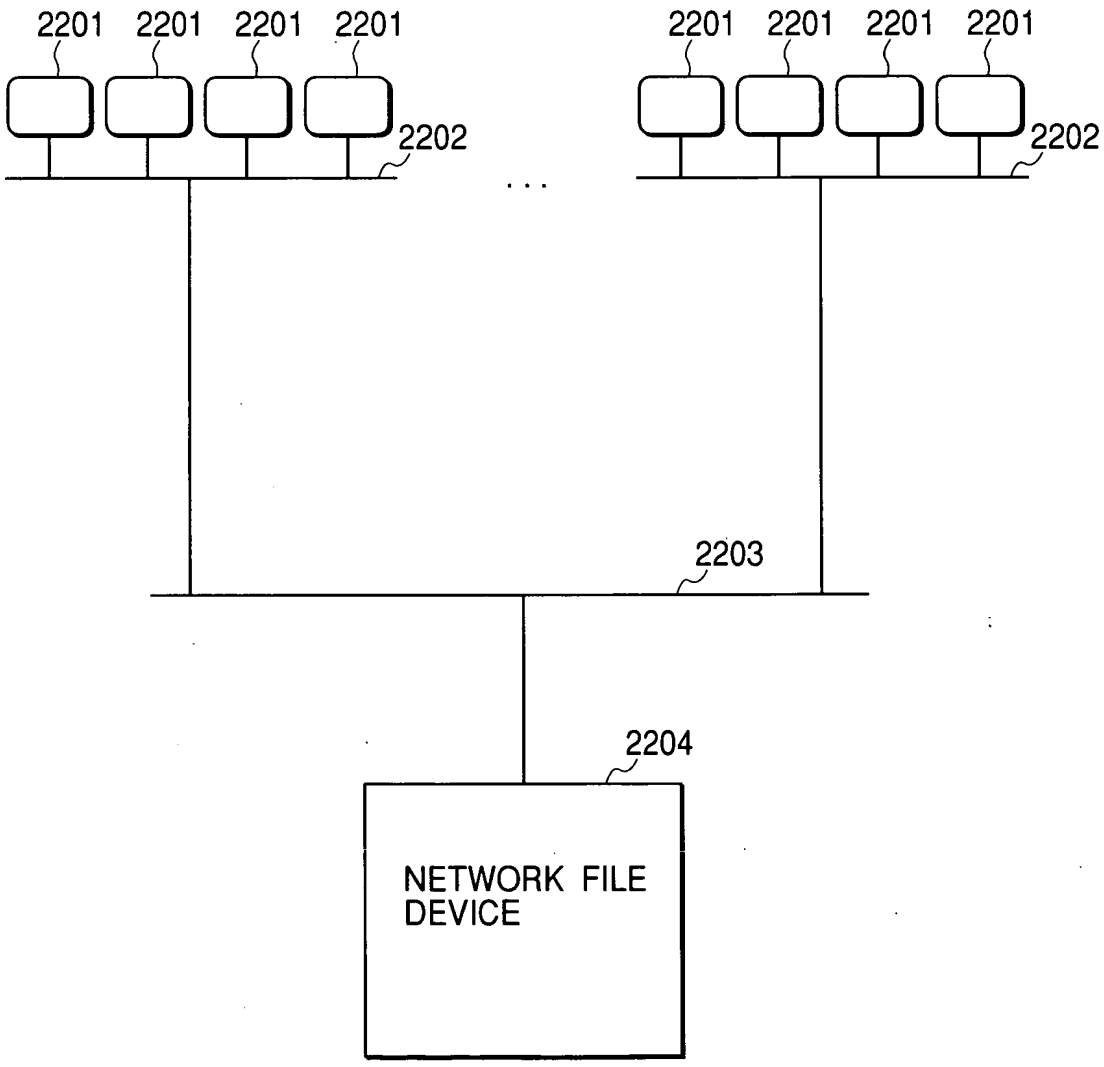

2101
NETWORK FILE DEVICE
2102
CLIENT MANAGEMENT FACILITY
2105
VIRTUAL NETWORK FILE FACILITY
2106
IP ADDRESS TRANSRATION FACILITY
2107
AMINISTRATION FACILITY
2108
CLIENT MIGRATION FACILITY
2103
CLIENT MANAGEMENT TABLE
2120
IP ADDRESS TRANSRATION TABLE
2104
DEVICE CAPACITY TABLE
2109
NETWORK FILE FACILITY
2110
CLIENT MANAGEMENT TABLE
CACHE
2111
2112
2112
2112
2112

FIG. 23


2201
2201
2201
2201
2202
2201
2201
2201
2201
2202
2203
2204
NETWORK FILE DEVICE